U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-269 242

Lake O' The Pines Camp, Marion, Morris, and Upshur Counties, Texas

National Eutrophication Survey, Corvallis, Oreg

Prepared for

Corvallis Environmental Research Lab, Oreg

Apr 77

PB 269 242

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY
WORKING PAPER SERIES

CORVALLIS ENVIRONMENTAL RESEARCH LABORATORY - CORVALLIS, OREGON

and

ENVIRONMENTAL MONITORING & SUPPORT LABORATORY - LAS VEGAS, NEVADA

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

☆G.P.O. 699-440

TECHNICAL REPORT DATA (Please read Instructions on the reverse before completing)	
1. REPORT NO.	2. / 3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Report on Lake O' The Pines, Camp, Marion, Morris, and Upshur Counties, Texas	5. REPORT DATE Prepared April 1977 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Anonymous (National Eutrophication Survey Staff)	8. PERFORMING ORGANIZATION REPORT NO. Working Paper # 648
9. PERFORMING ORGANIZATION NAME AND ADDRESS National Eutrophication Survey U.S. Environmental Protection Agency 200 S. W. 35th St. Corvallis, Oregon 97330	10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS Office of Research and Development U S. Environmental Protection Agency 401 M Street, S. W. Washington, DC 20460	13. TYPE OF REPORT AND PERIOD COVERED Final - 1974 14. SPONSORING AGENCY CODE
15. SUPPLEMENTARY NOTES Prepared in cooperation with the U.S. Environmental Protection Agency, National Environmental Research Center, Las Vegas, Nevada 89114	

16. ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
eutrophication lakes nutrients phosphorus nitrogen loading		05B 05C

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report)	21. NO. OF PAGES
Release unlimited		65
	20. SECURITY CLASS (This page)	22. PRICE PLA04 MFA01

EPA Form 2220-1 (9-73)

REPORT

ON

LAKE O' THE PINES

CAMP, MARION, MORRIS, AND

UPSHUR COUNTIES

TEXAS

EPA REGION VI

WORKING PAPER No. 648

WITH THE COOPERATION OF THE

TEXAS WATER QUALITY BOARD

AND THE

TEXAS NATIONAL GUARD

APRIL, 1977

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGEMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the Texas Water Quality Board for professional involvement, to the Texas National Guard for conducting the tributary sampling phase of the Survey, and to those Texas wastewater treatment plant operators who voluntarily provided effluent samples.

Hugh C. Yantis, Jr., Executive Director of the Texas Water Quality Board, and John B. Latchford, Jr., Director, and the staff of the Field Operations Division provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

Major General Thomas Bishop, the Adjutant General of Texas, and Project Officer Colonel William L. Seals, who directed the volunteer efforts of the Texas National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

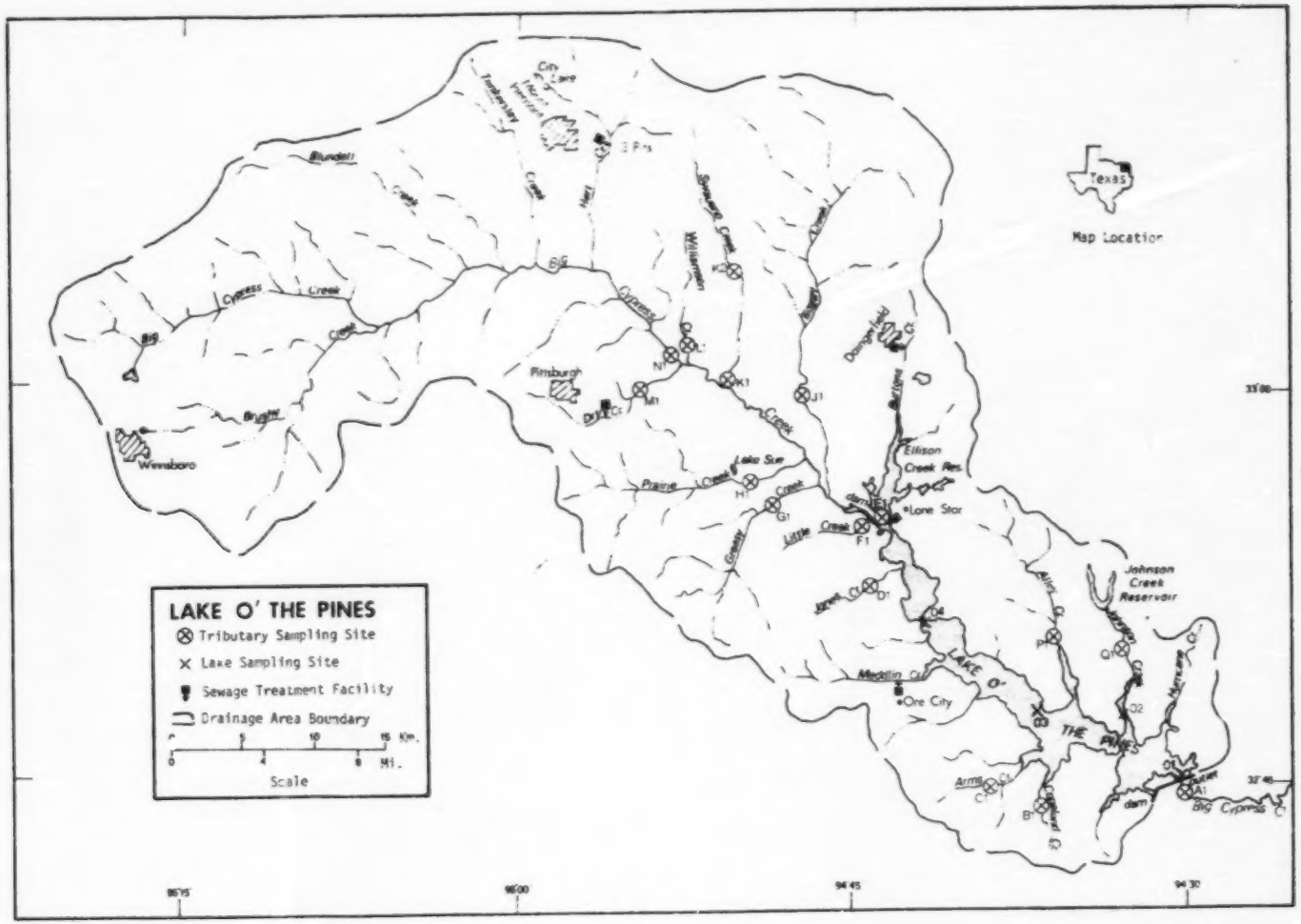
NATIONAL EUTROPHICATION SURVEY

STUDY RESERVOIRS

State of Texas

NAME	COUNTY
Amistad	Val Verde
Bastrop	Bastrop
Belton	Bell, Coryell
Braunig	Bexar
Brownwood	Brown
Buchanan	Burnet, Llano
Caddo	Harrison, Marion, TX; Caddo Parish, LA
Calaveras	Bexar
Canyon	Comal
Colorado City	Mitchell
Corpus Christi	Jim Wells, Live Oak, San Patricio
Diversion	Archer, Baylor
Eagle Mountain	Tarrant, Wise
Fort Phantom Hill	Jones
Houston	Harris
Kemp	Baylor
Lake O'The Pines	Camp, Marion, Morris, Upshur
Lavon	Collin
Lewisville (Garza-Little Elm)	Denton
Livingston	Polk, San Jacinto, Trinity, Walker

Lyndon B. Johnson	Burnet, Llano
Medina	Bandera, Medina
Meredith	Hutchinson, Moore, Potter
O. C. Fisher (San Angelo)	Tom Green
Palestine	Anderson, Cherokee, Henderson, Smith
Possum Kingdom	Palo Pinto, Stephens, Young
Sam Rayburn	Angelina, Jasper Nacogdoches, Sabine, San Augustine
Somerville	Burleson, Lee, Washington
E. V. Spence	Coke
Stamford	Haskell
Stillhouse Hollow	Bell
Tawakoni	Hunt, Rains, Van Zandt
Texoma	Cooke, Grayson TX; Bryan, Johnston, Love, Marshall, OK
Travis	Burnet, Travis
Trinidad	Henderson
Twin Buttes	Tom Green
White River	Crosby
Whitney	Bosque, Hill
Wright Patman (Texarkana)	Bowie, Cass


LAKE O' THE PINES
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
Drainage Area Boundary
Scale
Map Location
Texas
Pittsburg
Winnsboro
Lone Star
Ore City
Big Cypress Creek
Lake O' The Pines
Johnson Creek Reservoir
Ellison Creek Res.
Dam
9615
9600
9545
9530
3330
3245

LAKE O' THE PINES

STORET NO. 4818

I. CONCLUSIONS

A. Trophic Condition:

Survey data indicate that Lake O' The Pines is eutrophic; i.e., well supplied with nutrients and quite productive. Whether nutrient enrichment is beneficial or deleterious depends on the actual or potential effect on the uses of the lake. In this regard, no nuisance conditions are known to personnel of the Texas Water Quality Board and there is little or no impairment of the designated beneficial uses of this water body.

Lake O' The Pines ranked twenty-second in overall trophic quality when the 39 Texas reservoirs sampled in 1974 were compared using a combination of six parameters*. Seventeen of the reservoirs had less and one had the same median total phosphorus, 20 had less and one had the same median dissolved orthophosphorus, 34 had less median inorganic nitrogen, 23 had less mean chlorophyll a, and 13 had greater mean Secchi disc transparency. Marked depression or depletion of dissolved oxygen with depth occurred at stations 1 and 3 in May and at all stations in August.

Survey limnologists reported submerged vegetation, particularly near station 4 during the August sampling.

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* See Appendix A.

B. Rate-Limiting Nutrient:

The algal assay results indicate that the lake was limited by nitrogen at the time the sample was taken (08/23/74). The lake data indicate nitrogen limitation in March and November as well but phosphorus limitation in April.

C. Nutrient Controllability:

1. Point sources--During the sampling year, point sources contributed 29.5% of the total phosphorus load to Lake O' The Pines. The three wastewater treatment plants at Mount Pleasant collectively contributed an estimated 15.6%, and six other point sources contributed 13.7% of the total. Septic tanks serving lake-shore residences, parks, and campsites contributed an estimated 0.2% of the total load.

The present phosphorus loading of 0.86 $g/m^2/yr$ is over 1.5 times that proposed by Vollenweider (Vollenweider and Dillon, 1974) as a eutrophic loading (see page 16). Although complete removal of phosphorus at the listed point-sources would still leave a loading of 0.61 $g/m^2/yr$, if Vollenweider's eutrophic level is applicable to Texas reservoirs, point-source phosphorus control could at least slow the present rate of eutrophication by shifting the lake to a more phosphorus-limited condition.

2. Non-point sources--Non-point sources contributed 70.5% of the total phosphorus load to the lake during the sampling year.

Big Cypress Creek contributed 34.8%, and six other gaged tributaries collectively contributed 15.4%. Ungaged minor tributaries and immediate drainage contributed an estimated 18.3%.

The phosphorus export rates of the tributaries were somewhat higher than the rates of most of the Texas streams sampled elsewhere (see page 15). However, these higher rates are similar to the rates of tributaries of nearby Wright Patman Reservoir* and may be typical of this part of the state because of greater precipitation.

* Working Paper No. 669.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS†

A. Morphometry††:

1. Surface area: 75.27 kilometers^2.
2. Mean depth: 4.1 meters.
3. Maximum depth: >10.1 meters.
4. Volume: 308.607 x 10^6 m^3.
5. Mean hydraulic retention time: 221 days (based on outflow).

B. Tributary and Outlet:
(See Appendix C for flow data)

1. Tributaries -

Name	Drainage area (km^2)*	Mean flow (m^3/sec)*
Jones Creek	15.0	0.238
Ellison Cr. Res. outlet	95.8	1.275
Greasy Creek	77.2	1.119
Boggy Creek	233.1	1.535
Swauano Creek	60.1	0.793
Big Cypress Creek	947.9	6.130
Johnson Cr. Res. outlet	28.5	0.428
Minor tributaries & immediate drainage -	668.6	5.900
Totals	2,126.2	17.418

2. Outlet -

Big Cypress Creek	2,201.5	16.140

C. Precipitation***:

1. Year of sampling: 148.1 centimeters.
2. Mean annual: 113.9 centimeters.

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† Table of metric conversions--Appendix B.
†† Anonymous, 1974.
* For limits of accuracy, see Working Paper No. 175, "...Survey Methods, 1973-1976".
** Includes area of lake.
*** See Working Paper No. 175.

III. WATER QUALITY SUMMARY

Lake O' the Pines was sampled four times in 1974 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from two or more depths at four stations on the lake (see map, page vi). During each visit a single depth-integrated (4.6 m or near bottom to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the last visit, a single 18.9-liter depth-integrated sample was composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 9.1 meters at station 1, 4.9 meters at station 2, 10.7 meters at station 3, and 6.7 meters at station 4.

The sampling results are presented in full in Appendix D and are summarized in the following table (the August nutrient samples were not preserved properly and were not analyzed).

4. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR LAKE OF THE PINES
STORET CODE 4818

PARAMETER	1ST SAMPLING (3/22/74) 4 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (5/31/74) 4 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (8/23/74) 4 SITES RANGE	MEAN	MEDIAN
TEMP (C)	14.9 - 17.3	16.5	16.8	24.1 - 28.0	27.1	27.8	26.1 - 31.9	29.8	29.8
DISS OXY (MG/L)	8.2 - 10.0	8.8	8.6	0.8 - 6.8	4.9	6.1	0.0 - 8.0	3.7	2.8
CNDCTVY (MCROMO)	110. - 177.	131.	121.	137. - 201.	157.	149.	132. - 195.	155.	143.
PH (STAND UNITS)	6.4 - 7.9	7.0	6.9	6.8 - 7.5	7.3	7.3	6.8 - 8.3	7.4	7.3
TOT ALK (MG/L)	16. - 27.	21.	21.	21. - 39.	26.	22.	******	**********	
TOT P (MG/L)	0.018 - 0.116	0.038	0.025	0.018 - 0.083	0.039	0.027	******	**********	
ORTHO P (MG/L)	0.009 - 0.021	0.013	0.011	0.002 - 0.026	0.007	0.005	******	**********	
NO2+NO3 (MG/L)	0.020 - 0.050	0.034	0.040	0.040 - 0.120	0.061	0.060	******	**********	
AMMONIA (MG/L)	0.020 - 0.060	0.034	0.030	0.040 - 0.500	0.089	0.050	******	**********	
KJEL N (MG/L)	0.400 - 0.900	0.547	0.500	0.400 - 1.000	0.600	0.550	******	**********	
INORG N (MG/L)	0.040 - 0.100	0.068	0.070	0.080 - 0.550	0.151	0.110	******	**********	
TOTAL N (MG/L)	0.440 - 0.940	0.581	0.530	0.440 - 1.050	0.661	0.615	******	**********	
CHLRPYL A (UG/L)	4.4 - 27.2	12.1	8.4	8.4 - 44.2	22.1	17.8	11.7 - 15.5	12.7	11.8
SECCHI (METERS)	0.9 - 2.0	1.7	1.9	0.9 - 2.3	1.6	1.5	1.2 - 2.0	1.6	1.6

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR LAKE OF THE PINES
STORET CODE 4818

4TH SAMPLING (11/ 8/74)

PARAMETER	4 SITES RANGE	MEAN	MEDIAN
TEMP (C)	15.9 - 20.7	19.0	19.6
DISS OXY (MG/L)	5.6 - 7.6	6.9	7.2
CNDCTVY (MCROMO)	95. - 115.	105.	104.
PH (STAND UNITS)	5.7 - 6.8	6.5	6.6
TOT ALK (MG/L)	10. - 23.	16.	16.
TOT P (MG/L)	0.023 - 0.110	0.058	0.052
ORTHO P (MG/L)	0.006 - 0.055	0.029	0.028
NO2+NO3 (MG/L)	0.040 - 0.070	0.051	0.055
AMMONIA (MG/L)	0.030 - 0.100	0.058	0.055
KJEL N (MG/L)	0.200 - 0.600	0.407	0.400
INORG N (MG/L)	0.070 - 0.140	0.109	0.115
TOTAL N (MG/L)	0.240 - 0.670	0.459	0.460
CHLRPYL A (UG/L)	2.6 - 7.1	4.8	4.7
SECCHI (METERS)	0.7 - 1.8	1.3	1.3

B. Biological characteristics:

1. Phytoplankton* -

Sampling Date	Dominant Genera	Algal Units per ml
05/31/74	1. Chroomonas sp.	1,947
	2. Nitzschia sp.	974
	3. Cyclotella sp.	682
	4. Kirchneriella sp.	682
	5. Melosira sp.	682
	Other genera	2,189
	Total	7,156
11/08/74	1. Melosira sp.	643
	2. Cryptomonas sp.	245
	3. Scenedesmus sp.	214
	4. Chroomonas sp.	184
	5. Ankistrodesmus sp.	153
	Other genera	489
	Total	1,928

* The March and August phytoplankton samples were lost in shipment.

2. Chlorophyll a -

Sampling Date	Station Number	Chlorophyll a (µg/l)
03/22/74	1	6.0
	2	4.4
	3	10.9
	4	27.2
05/31/74	1	25.9
	2	9.8
	3	8.4
	4	44.2
08/23/74	1	11.7
	2	11.7
	3	11.9
	4	15.5
11/08/74	1	5.5
	2	3.9
	3	7.1
	4	2.6

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.016	0.049	0.8
0.050 P	0.066	0.049	0.9
0.050 P + 1.0 N	0.066	1.049	17.8
1.0 N	0.016	1.049	1.6

2. Discussion -

The control yield of the assay alga, Selenastrum capricornutum, indicates that the potential primary productivity

of Lake O' The Pines was moderate at the time the sample was taken (11/08/74). The lack of growth response with the addition of only phosphorus indicates that the lake was limited by nitrogen at that time. Note that the addition of only nitrogen resulted in a yield which was significantly greater than that of the control.

The lake data indicate nitrogen limitation in March and November as well; i.e., the mean inorganic nitrogen/ortho-phosphorus ratios were 8/1 or less at all stations. However, phosphorus limitation was indicated at all stations in April with the exception of station 4; i.e., the mean N/P ratios were 8/1 or greater, and phosphorus limitation would be expected.

Nitrogen limitation, as indicated by the algal assay or by in-lake nitrogen to phosphorus ratios, does not necessarily mean that the trophic condition of the lake can be improved by controlling nitrogen inputs. In many cases, the apparent condition of nitrogen-limitation results from excessive phosphorus input from point sources and is often accompanied by a corresponding increase in primary production. In such cases, the reversal of the enriched condition depends upon phosphorus control, not nitrogen control.

IV. NUTRIENT LOADINGS
(See Appendix E for data)

For the determination of nutrient loadings, the Texas National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page vi), except for the months of April and May when two samples were collected. Sampling was begun in September, 1974, and was completed in August, 1975.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Texas District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a U.S. Geological Survey computer program for calculating stream loadings*. Nutrient loads shown are those measured minus point-source loads, if any.

Nutrient loads for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the means of the nutrient loads, in kg/km^2/year, at stations D-1, G-1, and J-1 and multiplying the means by the ZZ area in km^2.

The operators of the Daingerfield, Ore City, and Lone Star Steel Co. wastewater treatment plants provided monthly effluent samples and corresponding flow data. The operators of the wastewater treatment plants at Tejas Village Resort, Pittsburg, and Mount Pleasant did not participate; nutrient loads from these sources were estimated at 1.134 kg P and 3.401 kg N/capita/year, and flows were estimated at 0.3785 m^3/capita/day.

* See Working Paper No. 175.

A. Waste Sources:

1. Known municipal† -

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
Ore City	830	oxid. pond	380.6	Lake O' The Pines
Lone Star Steel Co.	5,650	act. sludge	1,666.5*	Lake O' The Pines
Daingerfield	2,630	oxid. ditch	1,656.4	Burton Cr./Ellison Cr. Res.
Tejas Village Resort**	15	secondary	5.7	Lake O' The Pines
Pittsburg	2,800	tr. filter	1,059.8	Big Cypress Creek
Mount Pleasant -				
S.E. Plant		tr. filter		
N.E. Plant	8,877***	act. sludge	3,359.9	Hart Creek
S.W. Plant		act. sludge		

2. Known industrial** -

Name	Treatment	Mean Flow (m^3/d)	Receiving Water
Air Products & Chemical Inc.	?	36,525.3	Middle Barnes Res/Ellison Cr. Res.
Lone Star Steel Co.	(cooling water)	?	Ellison Cr. Res.
American Petrofina Co.	pond system	?	Tankers Creek

† Treatment plant questionnaires; Anonymous, 1971.
* Includes industrial waste.
** Wyatt, 1976.
*** 1970 Census.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/ yr	% of total
a. Tributaries (non-point load) -		
Jones Creek	180	0.3
Ellison Cr. Res. outlet	1,165	1.8
Greasy Creek	1,695	2.6
Boggy Creek	4,765	7.4
Swauano Creek	1,940	3.0
Big Cypress Creek	22,490	34.8
Johnson Cr. Res. outlet	215	0.3
b. Minor tributaries & immediate drainage (non-point load) -	11,835	18.3
c. Known municipal STP's -		
Ore City	440	0.7
Lone Star Steel Co.	2,505	3.9
Daingerfield	2,730	4.2
Tejas Village Resort	15	<0.1
Pittsburg	3,175	4.9
Mount Pleasant -	10,065	15.6
d. Septic tanks* -	95	0.2
e. Known industrial -		
Air Products & Chemicals Inc.	?	-
Lone Star Steel Co.	?	
American Petrofina Co.	?	
f. Direct precipitation** -	1,315	2.0
Total	64,625	100.0

2. Outputs -

Lake outlet - Big Cypres Creek 16,810

3. Net annual P accumulation - 47,815 kg.

* Estimate based on six campgrounds, seven parks, and 268 lakeshore dwellings; see Working Paper No. 175.
** See Working Paper No. 175.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/ yr	% of total
a. Tributaries (non-point load) -		
Jones Creek	4,040	0.6
Ellison Cr. Res. outlet	53,740	7.4
Greasy Creek	24,505	3.4
Boggy Creek	46,935	6.5
Swauano Creek	22,030	3.1
Big Cypress Creek	248,090	34.3
Johnson Cr. Res. outlet	12,725	1.8
b. Minor tributaries & immediate drainage (non-point load) -	172,490	23.8
c. Known municipal STP's -		
Ore City	580	<0.1
Lone Star Steel Co.	7,945	1.1
Daingerfield	5,475	0.8
Tejas Village Resort	50	<0.1
Pittsburg	9,525	1.3
Mount Pleasant -	30,190	4.2
d. Septic tanks* -	3,525	0.5
e. Known industrial -		
Air Products & Chemicals Inc.	?	-
Lone Star Steel Co.	?	
American Petrofina Co.	?	
f. Direct precipitation** -	81,260	11.2
Total	723,105	100.0

2. Outputs -

Lake outlet - Big Cypress Creek 388,395

3. Net annual N accumulation - 334,710 kg.

* Estimate based on six campgrounds, seven parks and 268 lakeshore dwellings; see Working Paper No. 175.
** See Working Paper No. 175.

D. Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km^2/yr	kg N/km^2/yr
Jones Creek	12	269
Ellison Cr. Res. outlet	12	561
Greasy Creek	22	317
Boggy Creek	20	201
Swauano Creek	32	367
Big Cypress Creek	24	262
Johnson Cr. Res. outlet	8	446

E. Mean Nutrient Concentrations in Ungaged Streams:

Tributary	Mean Total P Conc. (mg/l)	Mean Total N Conc. (mg/l)
Copeland Creek	0.032	0.568
Arms Creek	0.031	0.469
Little Creek	0.033	0.695
Prairie Creek	0.098	1.400
Williamson Creek	0.075	1.081
Dry Creek*	1.519	3.868
Alley Creek	0.027	0.401

* Sampling station downstream from Pittsburg STP.

F. Yearly Loads:

In the following table, the existing phosphorus loadings are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). Essentially, his "dangerous" loading is one at which the receiving water would become eutrophic or remain eutrophic; his "permissible" loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic loading would be considered one between "dangerous" and "permissible".

Note that Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m^2/yr	0.86	0.64	9.6	4.4

Vollenweider phosphorus loadings ($g/m^2/yr$) based on mean depth and mean hydraulic retention time of Lake O' The Pines:

"Dangerous" (eutrophic loading)	0.52
"Permissible" (oligotrophic loading)	0.26

V. LITERATURE REVIEWED

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VI. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
4801	AMISTAD LAKE	0.013	0.500	371.474	2.042	14.900	0.009
4802	BASTROP LAKE	0.022	0.090	419.917	12.392	15.000	0.007
4803	BELTON RESERVOIR	0.016	0.185	378.312	8.025	15.000	0.007
4804	BRAUNIG LAKE	0.134	0.150	461.625	22.762	14.800	0.062
4805	BROWNWOOD LAKE	0.027	0.100	470.375	4.887	14.400	0.007
4806	LAKE BUCHANAN	0.036	0.250	437.625	8.606	15.000	0.012
4807	CADDO LAKE	0.055	0.070	463.333	14.808	11.400	0.013
4808	CALAVERAS LAKE	0.038	0.060	461.667	22.500	13.000	0.007
4809	CANYON RESERVOIR	0.010	0.450	384.812	2.500	14.800	0.006
4810	LAKE COLORADO CITY	0.042	0.090	473.625	12.675	10.200	0.012
4811	CORPUS CRISTI LAKE	0.113	0.130	475.187	19.756	14.000	0.050
4812	DIVERSION LAKE	0.025	0.080	470.111	15.867	9.000	0.009
4813	EAGLE MOUNTAIN LAKE	0.024	0.070	469.625	5.662	11.000	0.008
4814	FT PHANTOM HILL LAKE	0.060	0.105	474.909	6.317	9.800	0.022
4815	GARZA LITTLE ELM RESERVO	0.045	0.380	475.782	14.156	14.600	0.018
4816	KEMP LAKE	0.023	0.110	455.000	10.217	10.400	0.007
4817	HOUSTON LAKE	0.097	0.260	486.187	16.650	12.400	0.036
4818	LAKE OF THE PINES	0.031	0.090	440.000	12.919	15.000	0.011
4819	LAVON RESERVOIR	0.063	0.180	485.333	5.400	8.800	0.018
4820	LIVINGSTON LAKE	0.196	0.555	465.469	16.112	15.000	0.128
4821	LYNDON B JOHNSON LAKE	0.042	0.420	456.500	8.100	14.900	0.013
4822	MEDINA LAKE	0.010	0.600	403.562	12.944	15.000	0.004
4823	LAKE MEREDITH	0.021	0.070	439.312	3.037	14.900	0.009
4824	PALESTINE LAKE	0.031	0.180	442.625	10.619	14.800	0.010
4825	POSSUM KINGDOM RESERVOIR	0.023	0.070	419.045	9.495	15.000	0.009
4826	SAN ANGELO RESERVOIR	0.098	0.140	481.000	24.675	10.200	0.011
4827	SAM RAYBURN RESERVOIR	0.029	0.150	439.458	6.267	15.000	0.009
4828	E V SPENCE RESERVOIR	0.036	0.080	462.583	11.775	15.000	0.008

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
4829	SOMERVILLE LAKE	0.053	0.115	473.833	24.491	13.000	0.013
4830	STAMFORD LAKE	0.073	0.060	482.714	18.457	10.600	0.012
4831	STILLHOUSE HOLLOW RESERV	0.018	0.160	406.250	3.917	15.000	0.010
4832	TAWAKONI LAKE	0.046	0.100	466.417	18.246	13.200	0.013
4833	TEXARKANA LAKE	0.106	0.120	478.500	19.119	12.400	0.030
4834	TEXOMA LAKE	0.042	0.160	451.321	12.493	15.000	0.018
4835	TRAVIS LAKE	0.018	0.250	389.913	5.595	15.000	0.007
4836	TRINIDAD	0.389	0.110	479.500	24.300	10.000	0.240
4837	TWIN BUTTES RESERVOIR	0.029	0.250	454.917	8.708	14.800	0.009
4838	WHITE RIVER RESERVOIR	0.020	0.110	434.500	4.333	15.000	0.009
4839	WHITNEY LAKE	0.028	0.120	430.500	6.912	15.000	0.008

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
4801	AMISTAD LAKE	95 (36)	5 (2)	100 (38)	100 (38)	39 (14)	63 (21)	402
4802	BASTROP LAKE	79 (30)	76 (29)	82 (31)	47 (18)	17 (0)	92 (34)	393
4803	BELTON RESERVOIR	92 (35)	26 (10)	97 (37)	68 (26)	17 (0)	84 (31)	384
4804	BRAUNIG LAKE	5 (2)	42 (16)	50 (19)	8 (3)	49 (17)	5 (2)	159
4805	BROWNWOOD LAKE	66 (25)	70 (26)	29 (11)	87 (33)	58 (22)	84 (31)	394
4806	LAKE BUCHANAN	47 (18)	21 (7)	74 (28)	63 (24)	17 (0)	39 (14)	261
4807	CADDO LAKE	26 (10)	91 (33)	42 (16)	32 (12)	76 (29)	30 (10)	297
4808	CALAVERAS LAKE	45 (17)	100 (38)	47 (18)	11 (4)	67 (25)	92 (34)	362
4809	CANYON RESERVOIR	99 (37)	8 (3)	95 (36)	97 (37)	49 (17)	97 (37)	445
4810	LAKE COLORADO CITY	39 (14)	76 (28)	26 (10)	42 (16)	88 (33)	39 (14)	310
4811	CORPUS CRISTI LAKE	8 (3)	47 (18)	18 (7)	13 (5)	61 (23)	8 (3)	155
4812	DIVERSION LAKE	68 (26)	83 (31)	32 (12)	29 (11)	97 (37)	63 (21)	372
4813	EAGLE MOUNTAIN LAKE	71 (27)	91 (33)	34 (13)	79 (30)	79 (30)	76 (28)	430
4814	FT PHANTOM HILL LAKE	24 (9)	66 (25)	21 (8)	74 (28)	95 (36)	16 (6)	296
4815	GARZA LITTLE ELM RESERVO	34 (13)	13 (5)	16 (6)	34 (13)	55 (21)	21 (7)	173
4816	KEMP LAKE	76 (29)	61 (22)	55 (21)	55 (21)	84 (32)	92 (34)	423
4817	HOUSTON LAKE	16 (6)	16 (6)	0 (0)	24 (9)	72 (27)	11 (4)	139
4818	LAKE OF THE PINES	54 (20)	76 (28)	66 (25)	39 (15)	17 (0)	46 (17)	298
4819	LAVON RESERVOIR	21 (8)	29 (11)	3 (1)	84 (32)	100 (38)	21 (7)	258
4820	LIVINGSTON LAKE	3 (1)	3 (1)	39 (15)	26 (10)	17 (0)	3 (1)	91
4821	LYNDON B JOHNSON LAKE	39 (14)	11 (4)	53 (20)	66 (25)	39 (14)	30 (10)	238
4822	MEDINA LAKE	99 (37)	0 (0)	89 (34)	37 (14)	17 (0)	100 (38)	342
4823	LAKE MEREDITH	82 (31)	91 (33)	71 (27)	95 (36)	39 (14)	63 (21)	441
4824	PALESTINE LAKE	54 (20)	32 (12)	63 (24)	53 (20)	49 (17)	51 (19)	302
4825	POSSUM KINGDOM RESERVOIR	74 (28)	91 (33)	84 (32)	58 (22)	17 (0)	63 (21)	387
4826	SAN ANGELO RESERVOIR	13 (5)	45 (17)	8 (3)	0 (0)	88 (33)	46 (17)	200
4827	SAM RAYBURN RESERVOIR	59 (22)	39 (15)	68 (26)	76 (29)	17 (0)	63 (21)	322
4828	E V SPENCE RESERVOIR	50 (19)	83 (31)	45 (17)	50 (19)	17 (0)	76 (28)	321

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
4829	SOMERVILLE LAKE	29 (11)	55 (21)	24 (9)	3 (1)	67 (25)	30 (10)	208
4830	STAMFORD LAKE	18 (7)	97 (37)	5 (2)	18 (7)	82 (31)	39 (14)	259
4831	STILLHOUSE HOLLOW RESERV	88 (33)	37 (14)	87 (33)	92 (35)	17 (0)	51 (19)	372
4832	TAWAKONI LAKE	32 (12)	70 (26)	37 (14)	21 (8)	63 (24)	30 (10)	253
4833	TEXARKANA LAKE	11 (4)	51 (19)	13 (5)	16 (6)	72 (27)	13 (5)	176
4834	TEXOMA LAKE	39 (14)	34 (13)	61 (23)	45 (17)	17 (0)	21 (7)	217
4835	TRAVIS LAKE	88 (33)	21 (7)	92 (35)	82 (31)	17 (0)	84 (31)	384
4836	TRINIDAD	0 (0)	61 (22)	11 (4)	5 (2)	92 (35)	0 (0)	169
4837	TWIN BUTTES RESERVOIR	59 (22)	21 (7)	58 (22)	61 (23)	49 (17)	63 (21)	311
4838	WHITE RIVER RESERVOIR	84 (32)	61 (22)	76 (29)	89 (34)	17 (0)	63 (21)	390
4839	WHITNEY LAKE	63 (24)	51 (19)	79 (30)	71 (27)	17 (0)	76 (28)	357

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	4809	CANYON RESERVOIR	445
2	4823	LAKE MEREDITH	441
3	4813	EAGLE MOUNTAIN LAKE	430
4	4816	KEMP LAKE	423
5	4801	AMISTAD LAKE	402
6	4805	BROWNWOOD LAKE	394
7	4802	BASTROP LAKE	393
8	4838	WHITE RIVER RESERVOIR	390
9	4825	POSSUM KINGDOM RESERVOIR	387
10	4835	TRAVIS LAKE	384
11	4803	BELTON RESERVOIR	384
12	4831	STILLHOUSE HOLLOW RESERV	372
13	4812	DIVERSION LAKE	372
14	4808	CALAVERAS LAKE	362
15	4839	WHITNEY LAKE	357
16	4822	MEDINA LAKE	342
17	4827	SAM RAYBURN RESERVOIR	322
18	4828	E V SPENCE RESERVOIR	321
19	4837	TWIN BUTTES RESERVOIR	311
20	4810	LAKE COLORADO CITY	310
21	4824	PALESTINE LAKE	302
22	4818	LAKE OF THE PINES	298
23	4807	CADDO LAKE	297
24	4814	FT PHANTOM HILL LAKE	296
25	4806	LAKE BUCHANAN	261
26	4830	STAMFORD LAKE	259
27	4819	LAVON RESERVOIR	258
28	4832	TAWAKONI LAKE	253

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
29	4821	LYNDON B JOHNSON LAKE	238
30	4834	TEXOMA LAKE	217
31	4829	SOMERVILLE LAKE	208
32	4826	SAN ANGELO RESERVOIR	200
33	4853	TEXARKANA LAKE	176
34	4815	GARZA LITTLE ELM RESERVO	173
35	4836	TRINIDAD	169
36	4804	BRAUNIG LAKE	159
37	4811	CORPUS CRISTI LAKE	155
38	4817	HOUSTON LAKE	139
39	4820	LIVINGSTON LAKE	91

APPENDIX B

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR TEXAS 12/0376

LAKE CODE 4818 LAKE O' THE PINES

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 2201.5

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
4818A1	2201.5	21.12	22.77	26.70	26.14	28.88	19.26	11.13	4.50	3.71	2.66	8.07	19.20	16.14
4818D1	15.0	0.566	0.595	0.396	0.368	0.425	0.076	0.025	0.008	0.037	0.051	0.150	0.178	0.238
4818E1	95.8	2.662	2.803	2.265	2.067	2.464	0.510	0.170	0.059	0.190	0.283	0.765	1.161	1.275
4818G1	88.2	2.350	2.577	2.435	1.642	1.982	0.425	0.096	0.048	0.156	0.221	0.651	0.934	1.119
4818J1	233.1	1.926	2.888	2.973	3.313	2.945	0.934	0.221	0.051	0.396	0.566	0.963	1.359	1.535
4818K1	60.1	1.671	1.756	1.218	1.359	1.557	0.311	0.122	0.037	0.127	0.178	0.510	0.736	0.793
4818N1	947.9	9.00	10.76	12.37	10.65	12.52	4.93	1.25	0.31	1.47	0.23	3.96	6.43	6.13
4818Q1	28.5	0.934	0.991	0.736	0.708	0.793	0.147	0.051	0.017	0.065	0.096	0.261	0.368	0.428
4818ZZ	743.3	11.89	13.03	10.76	9.91	11.04	2.55	0.71	0.23	0.99	1.42	3.68	5.10	5.90

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 2201.5
SUM OF SUB-DRAINAGE AREAS = 2212.0

TOTAL FLOW IN = 210.27
TOTAL FLOW OUT = 194.14

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4818A1	9	74	50.715	8	15.348				
	10	74	32.706	5	85.234				
	11	74	83.478	3	85.800				
	12	74	84.667	14	84.951				
	1	75	37.945	4	50.970				
	2	75	82.119	9	86.083				
	3	75	84.384	9	85.234				
	4	75	51.820	4	84.951	18	52.669		
	5	75	67.394	3	50.970	28	54.085		
	6	75	24.352	8	14.668				
	7	75	5.012	13	0.708				
	8	75	0.708	17	0.708				
4818D1	9	74	0.481	8	0.034				
	10	74	0.091	5	0.068				
	11	74	0.680	2	1.274				
	12	74	0.396	7	1.246				
	1	75	0.193	4	0.368				
	2	75	0.623	8	0.510				
	3	75	0.481	8	0.215				
	4	75	0.235	12	0.453	26	0.059		
	5	75	0.538	10	0.396	24	0.453		
	6	75	0.125	7	0.071				
	7	75	0.023	13	0.011				
	8	75	0.006	17	0.006				

TRIBUTARY FLOW INFORMATION FOR TEXAS 12/0376

LAKE CODE 4818 LAKE O' THE PINES

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4818E1	9	74	3.087	8	0.093				
	10	74	1.218	5	0.396				
	11	74	5.069	2	10.591				
	12	74	3.030	7	17.018				
	1	75	1.642	4	3.968				
	2	75	5.578	8	3.398				
	3	75	3.964	8	1.444				
	4	75	1.812	12	2.095	26	0.651		
	5	75	3.710	10	2.294	24	1.472		
	6	75	0.453	7	0.396				
	7	75	0.096	13	0.034				
	8	75	0.006	17	0.011				
4818G1	9	74	2.464	7	0.283				
	10	74	0.453	5	0.340				
	11	74	3.568	2	6.513				
	12	74	2.067	7	6.456				
	1	75	0.991	4	1.926				
	2	75	3.256	8	2.577				
	3	75	2.407	8	1.104				
	4	75	1.218	12	2.350	26	0.311		
	5	75	2.747	10	2.067	24	2.322		
	6	75	0.651	7	0.368				
	7	75	0.110	13	0.065				
	8	75	0.028	17	0.023				
4818J1	9	74	7.504	8	0.229				
	10	74	2.945	5	0.963				
	11	74	12.346	2	25.740				
	12	74	7.391	7	41.343				
	1	75	3.964	4	9.486				
	2	75	13.564	8	8.269				
	3	75	9.628	8	3.540				
	4	75	4.446	12	5.069	26	1.557		
	5	75	9.033	10	5.550	24	3.568		
	6	75	1.133	6	0.708				
	7	75	0.232	13	0.085				
	8	75	0.014	17	0.025				
4818K1	9	74	1.926	7	0.079				
	10	74	0.765	5	0.249				
	11	74	3.200	2	6.541				
	12	74	1.897	7	10.675				
	1	75	1.019	4	2.435				
	2	75	3.483	8	2.124				
	3	75	2.492	8	0.906				
	4	75	1.133	12	1.303	26	0.396		
	5	75	2.322	10	1.444	24	0.906		
	6	75	0.283	6	0.184				
	7	75	0.059	13	0.0				
	8	75	0.003	17	0.006				

TRIBUTARY FLOW INFORMATION FOR TEXAS 12/0376

LAKE CODE 4818 LAKE O' THE PINES

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4818N1	9	74	30.157	7	3.596				
	10	74	5.692	5	4.276				
	11	74	43.750	2	80.137				
	12	74	25.485	7	79.287				
	1	75	12.233	4	0.0				
	2	75	40.210	8	31.715				
	3	75	29.733	8	13.564				
	4	75	14.810	12	28.883	26	3.738		
	5	75	33.414	10	25.400	24	28.600		
	6	75	7.872	7	4.446				
	7	75	1.331	13	0.793				
	8	75	0.340	17	0.278				
481801	9	74	0.906	8	0.028				
	10	74	0.368	5	0.119				
	11	74	1.501	3	1.529				
	12	74	0.906	14	0.934				
	1	75	0.481	4	1.161				
	2	75	1.671	9	0.708				
	3	75	1.189	9	0.368				
	4	75	0.538	4	0.425	18	0.510		
	5	75	1.104	3	9.316	28	0.204		
	6	75	0.136	6	0.088				
	7	75	0.028	13	0.011				
	8	75	0.003	17	0.003				
4818ZZ	9	74	23.730						
	10	74	6.909						
	11	74	36.812						
	12	74	21.776						
	1	75	11.129						
	2	75	37.378						
	3	75	26.986						
	4	75	12.828						
	5	75	27.552						
	6	75	4.870						
	7	75	0.906						
	8	75	0.161						

38A

APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 76/02/11

481801
32 45 06.0 094 30 08.0
LAKE OF THE PINES
48315 TEXAS

11EPALES
3

2111202
0030 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/22	13 30	0000	16.9		75	111	7.10	21	0.040	0.400	0.050	0.012
	13 30	0005	16.8	8.6		111	6.90	23	0.030	0.500	0.040	0.010
	13 30	0015	16.8	8.5		111	6.80	27	0.030	0.500	0.040	0.011
	13 30	0025	16.8	8.6		111	6.70	24	0.030	0.500	0.040	0.011
74/05/31	09 30	0000	26.9		90	150	7.40	21	0.050	0.600	0.120	0.006
	09 30	0005	26.9	5.6		149	7.25	21	0.040	0.400	0.060	0.004
	09 30	0015	25.8	3.2		148	7.00	23	0.080	0.400	0.060	0.003
	09 30	0025	24.1	0.8		150	6.75	24	0.150	0.400	0.070	0.005
74/08/23	15 30	0000	29.7	7.8	66	135	8.10					
	15 30	0015	28.7	1.2		132	7.10					
	15 30	0027	26.1	0.2		161	6.80					
74/11/08	10 20	0000	20.4	7.2	60	95	6.75	13	0.050	0.300	0.060	0.013
	10 20	0005	20.6	7.2		102	6.63	13	0.040	0.300	0.050	0.024
	10 20	0015	20.7	7.2		101	6.65	13	0.050	0.300	0.060	0.045
	10 20	0030	20.5	7.4		97	6.68	14	0.040	0.400	0.060	0.033

40

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/22	13 30	0000	0.024	6.0	
	13 30	0005	0.025		
	13 30	0015	0.023		
	13 30	0025	0.024		
74/05/31	09 30	0000	0.019	25.9	
	09 30	0002			50.0
	09 30	0005	0.019		
	09 30	0015	0.018		1.0
	09 30	0025	0.021		
74/08/23	15 30	0000		11.7	
74/11/08	10 20	0000	0.031	5.5	
	10 20	0005	0.034		
	10 20	0015	0.043		
	10 20	0030	0.093		

STORET RETRIEVAL DATE 76/02/11

481602
32 47 40.0 094 32 42.0
LAKE OF THE PINES
48315 TEXAS

11EPALES
3

2111202
0015 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/22	13	55 0000	17.3		72	110	6.60	20	0.040	0.400	0.040	0.009
	13	55 0005	17.1	8.2		110	6.45	20	0.040	0.400	0.040	0.010
	13	55 0010	17.0	8.4		110	6.60	19	0.040	0.400	0.040	0.013
74/05/31	10	00 0000	28.0		72	145	7.35	22	0.040	0.500	0.040	0.004
	10	00 0005	28.0	6.6		147	7.30	21	0.050	0.400	0.040	0.002
	10	00 0012	27.8	6.0		145	7.20	21	0.040	0.400	0.050	0.004
74/08/23	15	10 0000	31.9	7.4	78	142	7.90					
	15	10 0015	29.0	1.0		137	7.00					
74/11/08	10	45 0000	20.7	7.2	72	105	6.61	11	0.030	0.300	0.040	0.006
	10	45 0005	20.7	7.2		101	6.53	10	0.040	0.300	0.040	0.017
	10	45 0016	20.6	6.6		103	6.57	10	0.030	0.200	0.040	0.015

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCOT LT REMNING PERCENT
74/03/22	13	55 0000	0.020	4.4	
	13	55 0005	0.018		
	13	55 0010	0.018		
74/05/31	10	00 0000	0.022	9.8	
	10	00 0005	0.020		
	10	00 0010			1.0
	10	00 0012	0.020		
74/08/23	15	10 0000		11.7	
74/11/08	10	45 0000	0.023	3.9	
	10	45 0005	0.028		
	10	45 0016	0.031		

STORET RETRIEVAL DATE 76/02/11

481803
32 47 42.0 094 36 40.0
LAKE OF THE PINES
48315 TEXAS

11EPALES
3

2111202
0040 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/22	14	20 0000	17.1		80	122	7.00	18	0.020	0.500	0.020	0.009
	14	20 0005	17.1	8.8		122	6.90	17	0.020	0.500	0.020	0.010
	14	20 0015	16.9	8.6		121	6.80	16	0.020	0.500	0.020	0.009
	14	20 0035	16.8	8.6		121	6.80	16	0.040	0.500	0.030	0.012
74/05/31	10	30 0000	27.9		48	139	7.40	22	0.050	0.600	0.060	0.005
	10	30 0005	27.9	6.6		137	7.35	22	0.060	0.600	0.060	0.026
	10	30 0015	27.9	6.8		137	7.50	22	0.040	0.500	0.070	0.006
	10	30 0026	24.8	1.0		160	7.00	39	0.500	1.000	0.050	0.005
74/08/23	14	45 0000	31.9	8.0	60	143	8.30					
	14	45 0015	30.0	4.0		139	7.50					
74/11/08	13	55 0000	18.7	7.2	42	115	6.70	23	0.060	0.600	0.070	0.014
	13	55 0005	16.1	7.0		113	6.65	23	0.060	0.400	0.060	0.020
	13	55 0015	18.7	6.8		111	6.61	20	0.070	0.400	0.060	0.043
	13	55 0031	18.5	7.6		109	6.64	22	0.060	0.500	0.060	0.032

42A

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/22	14	20 0000	0.027	10.9	
	14	20 0005	0.023		
	14	20 0015	0.030		
	14	20 0035	0.027		
74/05/31	10	30 0000	0.034	8.4	
	10	30 0005	0.032		
	10	30 0015	0.033		
	10	30 0026	0.061		
74/08/23	14	45 0000		11.9	
74/11/08	13	55 0000	0.051	7.1	
	13	55 0005	0.053		
	13	55 0015	0.059		
	13	55 0031	0.066		

STORET RETRIEVAL DATE 76/02/11

481804
32 50 57.0 094 41 59.0
LAKE OF THE PINES
48315 TEXAS

11EPALES
3

2111202
0025 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/22	14	45 0000	15.9		34	177	7.90	23	0.030	0.700	0.030	0.013
	14	45 0005	15.5	10.0		176	7.75	21	0.030	0.700	0.030	0.014
	14	45 0015	14.9	9.6		174	7.45	26	0.040	0.800	0.030	0.017
	14	45 0020	14.9	8.4		175	7.30	23	0.060	0.900	0.040	0.021
74/05/31	11	00 0000	27.9		36	200	7.55	38	0.060	0.900	0.070	0.011
	11	00 0005	27.9	6.2		201	7.55	37	0.050	0.800	0.060	0.007
	11	00 0018	27.8	6.4		192	7.55	37	0.040	0.900	0.050	0.007
74/08/23	14	15 0000	31.4	6.0	46	179	7.60					
	14	15 0015	29.9	1.6		185	7.20					
	14	15 0022	29.6	0.0		195	7.00					
74/11/08	14	35 0000	16.2	5.6	29	104	5.97	20	0.090	0.600	0.040	0.051
	14	35 0005	15.9	6.0		104	5.72	18	0.100	0.500	0.040	0.035
	14	35 0015	16.0	5.8		104	5.66	17	0.090	0.600	0.040	0.055

43A

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/22	14	45 0000	0.053	27.2	
	14	45 0005	0.067		
	14	45 0015	0.071		
	14	45 0020	0.116		
74/05/31	11	00 0000	0.083	44.2	
	11	00 0005	0.081		
	11	00 0018	0.079		
74/08/23	14	15 0000		15.5	
74/11/08	14	35 0000	0.089	2.6	
	14	35 0005	0.097		
	14	35 0015	0.110		

APPENDIX E

TRIBUTARY AND WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 75/03/10

4818A1
32 44 40.0 094 29 55.0 4
BIG CYPRESS CREEK
48201 MARION CO MAP
O/LAKE OF THE PINES
2NDRY RD 0.75 MI S# JCT # COUNTY RD 726
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/08	15	30	0.024	1.200	0.100	0.005K	0.015
74/10/05	15	05	0.068	1.100	0.020	0.005	0.010
74/11/03	09	10	0.040	0.600	0.080	0.005	0.020
74/12/14	14	15	0.056	0.500	0.048	0.016	0.040
75/01/04	15	00	0.064	1.100	0.032	0.010	0.050
75/02/09	14	40	0.040	1.000	0.040	0.008	0.020
75/03/09	15	05	0.035	0.600	0.025	0.010	0.030
75/04/04	15	00	0.005	0.500	0.020	0.005K	0.030
75/04/18	14	00	0.010	0.400	0.020	0.005	0.020
75/05/03	14	00	0.007	0.550	0.020	0.005	0.030
75/05/28	20	00	0.005	0.450	0.021	0.005	0.020
75/06/08	14	45	0.010	0.450	0.025	0.005K	0.030
75/07/13	15	35	0.155	1.000	0.140	0.020	0.080
75/08/17	14	50	0.060	0.850	0.220	0.015	0.050

45

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/10

481881
32 43 35.0 094 36 35.0 4
COPELAND CREEK
48 7.5 HARLETON
T/LAKE OF THE PINES
2NDRY RD BRDG 1.25 MI S JCT HWY 726
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/08	14	50	0.124	0.300	0.060	0.005K	0.010
74/10/05	14	35	0.104	0.200	0.025	0.010	0.070
74/11/03	08	55	0.048	0.400	0.065	0.010	0.030
74/12/14	14	00	0.096	0.200	0.048	0.008	0.020
75/01/04	16	00	0.088	0.200	0.040	0.010	0.020
75/02/09	15	25	0.096	0.400	0.048	0.008	0.010K
75/03/09	15	40	0.100	0.350	0.030	0.010	0.010
75/04/04	15	30	0.120	0.750	0.060	0.005K	0.010K
75/04/18	14	35	0.120	1.150	0.085	0.025	0.080
75/05/03	15	15	0.085	0.500	0.075	0.015	0.020
75/05/28	20	30	0.080	0.600	0.050	0.010	0.040
75/06/08	15	40	0.140	0.650	0.055	0.010	0.065
75/07/13	15	10	0.150	0.400	0.045	0.010	0.020
75/08/17	15	15	0.105	0.400	0.040	0.010	0.040

46.

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/03/10

481801
32 44 45.0 094 38 45.0 4
ARMS CREEK
48 7.5 ASLAND
T/LAKE OF THE PINES
HWY 450 BRDG 1 MI NW OF JCT N HWY 726
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/08	14 25		0.060	0.400	0.060	0.005	0.030
74/10/05	14 25		0.048	0.200	0.015	0.015	0.020
74/11/03	08 40		0.008	0.400	0.015	0.010	0.035
74/12/14	13 30		0.032	0.150	0.040	0.008	0.025
75/01/04	15 30		0.040	0.800	0.072	0.015	0.030
75/02/09	15 10		0.040	0.250	0.040	0.008	0.010K
75/03/09	15 30		0.040	0.350	0.030	0.010	0.020
75/04/04	15 10		0.040	0.250	0.040	0.010	0.010
75/04/18	14 20		0.045	0.300	0.045	0.010	0.020
75/05/03	15 00		0.055	0.550	0.060	0.010	0.020
75/05/28	20 20		0.065	0.300	0.055	0.010	0.030
75/06/08	15 30		0.120	0.800	0.055	0.010	0.050
75/07/13	15 18		0.125	0.350	0.050	0.010	0.050
75/08/17	15 05		0.095	0.650	0.040	0.020	0.080

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/03/10

481401
32 52 25.0 094 44 10.0 4
JONES CREEK
48 7.5 ORE CITY
T/LAKE OF THE PINES
RT 259 BRDG 5 MI NW OF ORE CITY
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/08	11	15	0.036	0.300	0.030	0.005	0.040
74/10/05	13	10	0.064	0.100	0.005	0.005	0.010K
74/11/02	15	05	0.032	0.300	0.020	0.010	0.050
74/12/07	13	50	0.032	1.100	0.064	0.015	0.030
75/01/04	14	32	0.032	1.100	0.048	0.005	0.020
75/02/08	12	05	0.032	0.200	0.024	0.008	0.020
75/03/08	11	35	0.025	0.400	0.035	0.005	0.020
75/04/12	11	50	0.025	1.050	0.060	0.005	0.030
75/04/26	10	00	0.030	0.300	0.070	0.005	0.030
75/05/10	10	10	0.040	0.250	0.065	0.010	0.010
75/05/24	09	30	0.015	0.200	0.055	0.005	0.020
75/06/07	12	48	0.045	0.350	0.060	0.010	0.020
75/07/13	11	55	0.090	0.250	0.030	0.005K	0.020
75/08/17	14	30	0.140	0.800	0.030	0.020	

48
A

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/03/10

4818E1
32 55 07.0 094 43 35.0 4
ELLISON CREEK RES
48 7.5 LONE STAR
T/LAKE OF THE PINES
AT SPILLWAY ON ELLISON CREEK RES DAM
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/08	10 30		0.336	0.500	0.035	0.005K	0.030
74/10/05	13 00		0.368	0.400	0.040	0.005	0.020
74/11/02	14 45		0.248	0.700	0.230	0.005	0.040
74/12/07	13 30		0.384	1.400	0.104	0.005	0.020
75/01/04	14 00		0.368	1.500	0.172	0.005K	0.030
75/02/08	12 0.		0.336	0.900	0.384	0.008	0.020
75/03/08	11 25		0.375	1.750	0.290	0.005	0.060
75/04/12	11 45		0.400	0.850	0.060	0.010	0.040
75/04/26	09 45		0.315	2.200	0.065	0.005	0.030
75/05/10	10 00		0.105	0.450	0.016	0.005K	0.010K
75/05/24	09 25		0.125	0.800	0.125	0.005K	0.020
75/06/07	12 15		0.175	0.850	0.170	0.005	0.030
75/07/13	11 45		0.200	0.450	0.040	0.005K	0.030
75/08/17	13 00		0.035	1.350	0.040	0.010	

49

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/03/10

4818F1
32 54 15.0 094 45 30.0 4
ITTLE CREEK
48 7.5 LAFAYETTE
T/LAKE OF THE PINES
HWY 557 BRDG 1.75 MI NW JCT W US RT 259L
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/07	15 00		0.028	0.500	0.050	0.010	0.047
74/10/05	09 00		0.024	0.100	0.025	0.100	0.118
74/11/02	10 15		0.032	0.300	0.040	0.010	0.040
74/12/07	09 55		0.024	0.900	0.048	0.005	0.020
75/01/04	14 15		0.024	1.300	0.056	0.008K	0.020
75/02/08	10 10		0.024	0.200	0.032	0.008	0.010K
75/03/08	09 20		0.030	0.300	0.035	0.005	0.010
75/04/12	09 40		0.020	0.600	0.045	0.005	0.030
75/04/26	08 05		0.035	0.450	0.090	0.010	0.040
75/05/10	08 20		0.045	0.600	0.130	0.015	0.015
75/05/24	07 45		0.025	0.900	0.055	0.005	0.020
75/06/07	09 50		0.060	1.950	0.095	0.010	0.030
75/07/13	11 25		0.085	0.250	0.040	0.005	0.030
75/08/17	12 50		0.070	0.850	0.075	0.015	

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/03/10

481861
32 55 20.0 094 44 35.0 4
GREASY CREEK
48 7.5 LAFAYETTE
T/LAKE OF THE PINES
HWY 557 BRDG 6.00 MI NW JCT W US RT 259
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/07	14 45		0.104	0.500	0.045	0.035	0.080
74/10/05	09 10		0.104	0.700	0.025	0.015	0.020
74/11/02	10 25		0.040	0.600	0.037	0.015	0.070
74/12/07	10 05		0.040	0.600	0.040	0.020	0.050
75/01/04	09 50		0.040	0.900	0.056	0.015	0.050
75/02/08	10 20		0.048	0.100K	0.032	0.008	0.020
75/03/08	09 30		0.035	0.700	0.035	0.010	0.020
75/04/12	09 50		0.035	0.600	0.055	0.015	0.040
75/04/26	08 15		0.075	0.350	0.110	0.015	0.030
75/05/10	08 25		0.085	0.400	0.100	0.015	0.020
75/05/24	07 50		0.065	0.500	0.090	0.015	0.050
75/06/07	10 00		0.140	0.850	0.065	0.020	0.070
75/07/13	09 37		0.195	0.450	0.035	0.020	0.070
75/08/17	13 10		0.080	0.750	0.090	0.040	0.100

STA

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/03/10

4818H1
32 56 05.0 094 49 45.0 4
PRAIRIE CREEK
48 7.5 LAFAYETTE
T/LAKE OF THE PINES
BANK SAMP ON DIRT RD 0.75 MI N JCT 557
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/07	14	20	0.216	0.800	0.050	0.075	0.160
74/10/05	09	15	0.152	0.400	0.025	0.030	0.060
74/11/02	10	45	0.072	0.700	0.050	0.045	0.100
74/12/07	10	20	0.096	0.500	0.048	0.040	0.090
75/01/04	10	10	0.112	0.700	0.056	0.030	0.080
75/03/08	09	45	0.135	0.600	0.040	0.015	0.050
75/04/12	10	00	0.145	0.900	0.110	0.040	0.090
75/07/13	09	50	0.220	0.550	0.100	0.065	0.160
75/08/17	12	00	2.400	3.900	0.015	0.095	0.095

STORET RETRIEVAL DATE 76/03/10

481801
32 59 37.0 094 47 25.0 4
BOGGY CREEK
48 7.5 LAFAYETTE
T/LAKE OF THE PINES
HWY 144 BRDG 5 MI S JCT W HWY 11
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/08	09 50		0.120	0.500	0.055	0.045	0.085
74/10/05	11 30		0.096	0.400	0.040	0.040	0.070
74/11/02	13 40		0.024	0.800	0.030	0.050	0.100
74/12/07	12 50		0.016	0.600	0.048	0.032	0.080
75/01/04	13 30		0.032	1.400	0.032	0.025	0.070
75/02/08	11 50		0.040	0.300	0.016	0.024	0.040
75/03/08	11 05		0.050	0.450	0.110	0.020	0.060
75/04/12	11 25		0.075	1.100	0.072	0.035	0.100
75/04/26	09 20		0.290	1.900	0.175	0.145	0.220
75/05/10	09 45		0.115	0.800	0.115	0.050	0.070
75/05/24	09 05		0.135	0.850	0.085	0.050	0.130
75/06/06	11 40		0.315	0.800	0.060	0.045	0.135
75/07/13	11 05		0.280	0.550	0.030	0.045	0.100
75/08/17	14 02		0.140	1.300	0.050	0.035	

53A

STORET RETRIEVAL DATE 75/03/10

481SK1
33 00 30.0 094 50 37.0 4
S#AUMO CREEK
48 7.5 CASON
T/LAKE OF THE PINES
2NDRY RD BRDG 2 MI S JCT # HWY 11
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/07	11 30		0.052	0.800	0.070	0.020	0.120
74/10/05	11 10		0.080	0.300	0.010	0.015	0.050
74/11/02	13 15		0.040	0.700	0.050	0.040	0.110
74/12/07	12 30		0.032	1.400	0.216	0.048	0.090
75/01/04	13 00		0.048	1.300	0.032	0.015	0.060
75/02/08	11 35		0.096	0.400	0.032	0.016	0.030
75/03/08	10 50		0.065	0.850	0.050	0.010	0.050
75/04/12	11 10		0.085	0.800	0.110	0.015	0.065
75/04/26	09 10		0.195	0.500	0.100	0.020	0.070
75/05/10	09 30		0.140	0.650	0.110	0.030	0.070
75/05/24	08 50		0.145	0.650	0.080	0.025	0.110
75/06/06	11 00		0.200	1.000	0.155	0.010	0.140
75/08/17	14 00		0.035	0.450	0.090	0.005	0.060

STORET RETRIEVAL DATE 76/03/10

481HK2
33 04 26.0 094 50 17.0 4
SWAUANO CHEEK
48 7.5 CASON
T/LAKE OF THE PINES
2NDRY RD BRDG 1 MI E HICKORY HILL
11EPALES 2111204
0000 FEET DEPTH CLASS 00

	DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
	74/09/07	10 40		0.132	0.500	0.055	0.025	0.070
	74/10/05	10 30		0.120	0.400	0.160	0.015	0.030
	74/11/02	12 50		0.056	0.600	0.050	0.025	0.070
	74/12/07	12 10		0.056	1.100	0.032	0.016	0.060
	75/01/04	12 30		0.068	1.100	0.040	0.010	0.040
	75/02/08	11 15		0.112	0.500	0.032	0.016	0.025
	75/03/08	10 35		0.060	0.750	0.032	0.010	0.030
	75/04/12	10 30		0.095	1.150	0.075	0.015	0.050
	75/04/26	08 55		0.210	0.875	0.128	0.020	0.050
	75/05/10	09 10		0.160	0.600	0.095	0.025	0.030
	75/05/24	08 35		0.175	0.700	0.100	0.030	0.060
C	75/06/06	11 15		0.250	1.100	0.090	0.030	0.130
C	75/07/13	10 00		0.180	0.600	0.085		0.050
A	75/08/17	13 50		0.030	0.800	0.195	0.020	0.120

STORET RETRIEVAL DATE 75/03/10

481BL1
33 01 38.0 094 52 25.0 4
WILLIAMSON CREEK
48 7.5 CASON
T/LAKE OF THE PINES
HWY 11 BRDG 1 MI SW OF JCT W HWY 2348
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/07	12 00		0.082	0.300	0.015	0.022	0.050
74/10/05	10 00		0.096	0.300	0.030	0.010	0.020
74/11/02	12 30		0.040	0.600	0.050	0.015	0.050
74/12/07	10 00		0.032	0.700	0.024	0.016	0.040
75/01/04	11 30		0.056	1.200	0.032	0.010	0.030
75/02/08	11 05		0.080	0.200	0.024	0.008	0.010
75/03/08	10 50		0.020	0.350	0.020	0.005	0.030
75/04/12	10 35		0.055	0.800	0.050	0.010	0.030
75/04/26	08 40		0.105	0.750	0.160	0.015	0.040
75/05/10	08 55		0.110	0.400	0.135	0.025	0.025
75/05/24	08 20		0.120	0.800	0.072	0.022	0.050
75/06/06	10 35		0.170	0.800	0.070	0.020	0.100
75/07/13	10 05		0.125	1.000	0.040	0.027	0.060
75/08/17	13 40		2.400	3.450	0.380	0.010	

STORET RETRIEVAL DATE 76/03/10

4818M1
32 59 45.0 094 54 35.0 4
DRY CREEK
48 [illegible]5 PITTSBURG
T/LAKE OF THE PINES
2NDRY RD BRDG 1 MI NW JCT W HWY 11
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/07	13 15		0.384	8.800		3.200	4.500
74/10/05	09 40		1.160	2.000	1.250	0.540	0.790
74/11/02	11 20		0.352	0.800	0.200	0.097	0.205
74/12/07	10 45		0.352	1.800	0.248	0.064	0.170
75/02/08	10 50		0.552	0.600	0.264	0.056	0.140
75/03/08	10 05		0.480	1.150	0.610	0.145	0.360
75/04/12	10 20		0.375	1.050	0.460	0.110	0.281
75/04/26	08 30		0.620	2.500	1.400	0.315	0.580
75/05/10	08 40		0.590	1.100	0.450	0.165	0.300
75/05/24	08 05		0.630	1.200	0.560	0.190	0.390
75/06/06	10 20		0.680	3.100	0.330	0.065	0.630
75/07/13	09 56		0.080	6.900	4.700	2.750	3.700
75/08/17	13 30		0.030	13.000	9.200	6.600	7.700

STORET RETRIEVAL DATE 76/03/10

4816N1
33 01 15.0 094 52 55.0 4
BIG CYPRESS CREEK
48 7.5 HARVARD
T/LAKE OF THE PINES
HWY 11 BRDG 1.75 MI SW JCT W HWY 2348
11EPALES 21112J4
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/07	13	10	0.320	0.900	1.650	0.100	0.190
74/10/05	09	55	0.384	0.900	0.310	0.070	0.120
74/11/02	12	30	0.056	0.800	0.040	0.095	0.150
74/12/07	10	55	0.096	0.900	0.032	0.088	0.150
75/01/04	11	00	0.128	1.100	0.064	0.040	0.100
75/02/08	11	00	0.075	0.400	0.016	0.024	0.050
75/03/08	10	15	0.220	0.750	0.057	0.050	0.110
75/04/12	10	30	0.055	0.750	0.065	0.035	0.070
75/04/26	08	35	0.590	1.250	0.115	0.075	0.200
75/05/10	08	50	0.150	0.850	0.080	0.060	0.090
75/05/24	08	15	0.130	1.550	0.105	0.085	0.140
75/06/07	10	30	0.520	1.650	0.080	0.050	0.240
75/07/13	10	00	1.500	0.900	0.050	0.185	0.320
75/08/17	13	35	3.150	1.200	0.055	0.345	0.500

STORET RETRIEVAL DATE 74/03/10

4818F1
32 50 30.0 094 36 05.0 4
ALLEY CREEK
48 7.5 LASSATER
T/LAKE OF THE PINES
2NDRY RD BRDG 1.5 MI NE OF JCT W HWY 729
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/08	16	30	0.056	0.400	0.030	0.005K	0.020
74/10/05	16	00	0.040	0.200	0.030	0.010	0.010
74/11/03	10	00	0.008	0.400	0.035	0.010	0.030
74/12/14	15	00	0.032	0.500	0.040	0.008K	0.020
75/01/04	14	30	0.032	0.300	0.024	0.005	0.020
75/02/09	14	10	0.040	0.700	0.040	0.008K	0.020
75/03/09	14	45	0.030	0.300	0.025	0.005	0.010
75/04/04	14	20	0.060	0.250	0.045	0.010	
75/04/18	13	30	0.035	0.250	0.060	0.005	0.020
75/05/03	13	40	0.050	0.500	0.045	0.010	0.050
75/05/28	19	30	0.040	0.250	0.070	0.005	0.030
75/06/06	14	00	0.080	0.300	0.095	0.010	0.030
75/07/13	11	10	0.110	0.250	0.050	0.015	0.040
75/08/17	14	20	0.095	0.300	0.050	0.015	0.050

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/03/10

481841
32 49 55.0 094 32 55.0 4
JOHNSON CREEK RES
48 7.5 LASSATER
T/LAKE OF THE PINES
2NDRY RD BRDG 3.0 MI SE OF JCT # HWY 49
11EPALES 2111204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/09/08	16 05		0.024	1.100	0.060	0.005K	0.015
74/10/05	15 35		0.045	0.300	0.030	0.010	0.010
74/11/03	09 40		0.008	0.500	0.020	0.010	0.030
74/12/14	14 30		0.096	0.600	0.032	0.008K	0.020
75/01/04	14 10		0.112	0.500	0.024	0.005	0.010
75/02/09	13 50		0.072	0.500	0.024	0.008	0.010K
75/03/09	14 30		0.045	0.425	0.025	0.010	0.010
75/04/04	14 00		0.030	0.500	0.055	0.005	0.010
75/04/18	13 05		0.020	0.350	0.050	0.010	0.020
75/05/03	13 20		0.045	2.300	0.110	0.010	
75/05/28	19 10		0.010	0.400	0.040	0.005	0.020
75/06/06	14 15		0.020	3.900	0.065	0.005	0.020
75/07/13	16 00		0.025	0.500	0.160	0.030	0.068
75/08/17	14 00		0.010	1.150	0.040	0.010	0.090

09
A

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/03/10

4818XA 004818XA P002630
33 02 00.0 094 42 30.0 4
DAINGERFIELD
48201 7.5 DAINGERFIELD
T/LAKE O' THE PINES
BURTON CREEK
11EPALES 2141204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/08/14	15	17	21.000	2.800	0.270	16.000	16.000	0.140	0.180
74/09/23	10	00							
CP(T)-			8.100	1.300	0.470	5.800	5.800	0.311	0.464
74/09/23	15	20							
74/10/22	09	30							
CP(T)-			17.600	1.700	0.410	13.500	13.500	0.149	0.194
74/10/22	14	15							
74/11/13	09	30							
CP(T)-			5.200	1.100	0.250	2.800	3.150	0.554	0.583
74/11/13	13	50							
74/12/09	10	00							
CP(T)-			5.400	3.000	0.590	3.400	3.900	0.527	0.711
74/12/09	15	00							
75/01/16	10	00							
CP(T)-			10.000	2.200	0.420	5.700	6.100	0.335	0.396
75/01/16	15	00							
75/02/13	09	30	7.430	1.000	0.100	3.715	4.200	0.463	0.270
75/03/17	10	00							
CP(T)-			4.000	1.000K	0.200	1.680	1.800	0.927	0.575
75/03/17	15	00							
75/04/17	10	30							
CP(T)-			6.800	3.000	0.520K	3.000	3.200	0.561	0.573
75/04/17	15	45							
75/05/16	10	30							
CP(T)-			4.700	1.000	0.100	2.600	3.200	0.960	0.755
75/05/16	15	15							
75/06/19	10	00							
CP(T)-			14.000	0.500K	0.200	7.900	7.900	0.278	0.329
75/06/19	15	00							
75/07/14	10	00							
CP(T)-			18.000	3.000	1.500	9.000	9.000	0.203	0.221
75/07/14	15	05							

K VALUE KNOWN TO BE
LESS THAN INDICATED

61
A

STORET RETRIEVAL DATE 76/03/10

4818YA AS4818YA P000930
32 48 00.0 094 43 00.0 4
ORE CITY
48 7.5 ORE CITY
T/LAKE O' THE PINES
MEDLIN CREEK
11EPALES 21412.4
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/08/13	11 00		0.160	9.800	1.710	7.100	7.400	0.024	0.027
74/09/10	10 30		0.040	11.000	0.710	6.650	8.200	0.094	0.103
74/10/21	10 30		0.040	7.200	0.050	7.100	7.700	0.115	0.100
74/12/30	11 00		0.117	1.000K	0.117	0.160	1.600		0.100
75/02/05			0.240	1.000K	0.050K	0.110	0.270	0.115	0.110
75/03/11	10 50		0.240	1.000K	0.520	0.260	0.260	0.130	0.115
75/04/16	10 05		0.200	0.500K	0.170	0.160	0.400	0.116	0.115
75/05/21	10 00		0.150	2.400	0.071	1.050	1.600	0.115	0.112
75/07/16			0.025	8.175	0.600	4.700	5.500	0.116	0.123

62

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/.0

481821 AS481821 P005650*
32 57 30.0 094 43 00.0 4
LONE STAR STEEL CO
48315 7.5 LONE STAR
D/LAKE O' THE PINES
LAKE O' THE PINES
11EPALES 2141204
0000 FEET DEPTH CLASS 00

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/09/20	14 00		1.120	10.500	6.100	4.250	4.500	0.400	0.350
74/10/31	10 00		1.040	3.500	1.550	0.970	1.050	0.504	0.265
74/11/27	10 30		0.720	14.000	5.900	2.650	5.000	0.417	0.406
74/12/31	09 40		0.240	9.800	7.300	4.100	4.300	0.392	0.425
75/01/30	09 10		0.080	23.000	12.000	6.750	8.850	0.392	0.484
75/02/27	10 50		0.020	18.000	7.600	3.800	5.400	0.470	0.556
75/03/31	15 15		0.222	11.000	8.000	2.760	2.900	0.491	0.571
75/04/30	11 10		0.150	12.000	7.400	4.000	4.800	0.500	0.474
75/05/30	09 15		1.250	9.000	8.900	3.520	3.600	0.491	0.507
75/06/26	09 25		2.900	8.100	4.300	0.800	1.100	0.381	0.433
75/07/30	09 10		0.150	11.500	4.100	1.250	1.600	0.467	0.397
75/08/29	09 20		0.150	20.500	12.000	5.800	7.250	0.427	0.415

6.3